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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Michael Kagan

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Dr. Mark Friedman Ltd.
c/o Discovery Dispatch
9003 Florin Way
Upper Marlboro, MD 20772

EXAMINER

TANG, KENNETH

ART UNIT

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2195

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 09/991,692	Applicant(s) KAGAN ET AL.	
	Examiner KENNETH TANG	Art Unit 2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is in response to the Amendment filed on 5/3/07. Applicant's arguments have been fully considered but are found to be persuasive. However, Applicant's new ground of rejection has rendered the argument moot.
2. Claims 1-30 are presented for examination.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1-9 and 16-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parthasarathy et al. (hereinafter Parthasarathy) (US 2002/0184392 A1) in view of White (US 6,058,425), and further in view of Miller et al. (hereinafter Miller) ("Operating System Structure and Processor Architecture for a Large Distributed Single Address Space", Computer Science and Engineering Department of Arizona State University, 1998).**

4. As to claim 1, Parthasarathy teaches a method for controlling access by processing running on a host device (host system 130, Fig. 2) to a communication network (Fig. 2, 10'), the method comprising:

assigning to each of the processes a respective doorbell address on a network interface adapter (host-fabric adapter 120 from Fig. 4B) that couples the host device to the network (address translation interface 714 and doorbell manager interface 720, Fig. 7) ([0071]);

by a driver of the network interface adaptor, receiving a request submitted by a given one of the processes to its respective doorbell address, to access one of the allocated service, which is specified in the request (*see Abstract, claim 13, and [0077], [0063], etc.*); and

by the network interface adapter, conveying data (data transfer) over the network (host-fabric), subject to verifying (verify and validity), based on the doorbell address to which the request was submitted (*see Abstract, [0063] and [0052]*).

Parthasarathy fails to explicitly teach allocating a plurality of instances of a communication service on the network, to be provided via the adapter, to at least some of the processes on the host device, such that each of the instances is allocated to a particular one of the processes. However, White teaches multiple TCP/IP instances operating with agents/adapters in a communication system between a client and network (*col. 1, lines 44-67 – col. 2, lines 1-3, col. 8, lines 9-18*). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the feature of allocating a plurality of instances of a communication service on the network, to be provided via the adapter, to at least some of the processes on the host device, such that each of the instances is allocated to a particular one of the processes to the existing network communication system of Parthasarathy because this would allow for an improved communication using TCP/IP and with the benefit of allowing multiple copies of a server on a single computer system (*col. 1, lines 32-67, col. 2, lines 16-20*).

5. Parthasarathy teaches using an address range ([0047]) but is silent on assigning a single respective doorbell address in an address range, in an address space of the host device.

However, Miller teaches that is well known and conventional for a process to be assigned a single address in memory (plurality or range of addresses) in order for protection from other processes (page 1, under Section 1). Therefore, it would have been obvious to one of ordinary skill in the art for Parthasarathy's invention to include assigning a single respective doorbell address in an address range of the host device, as taught in Miller as being well known, conventional, and not novel. The suggestion/motivation for doing so would have been to provide separate addresses/locations that would allow for protection from other processes (page 1, under Section 1).

6. As to claim 2, modified Parthasarathy teaches wherein assigning the respective doorbell address comprises assigning a single page in an address space of the host device to each of the processes for use thereby as the respective doorbell ([0029], [0032], [0049], [0055]).

7. As to claim 3, modified Parthasarathy teaches wherein allocating the instances comprises allocating multiple instances to a single one of the processes, and wherein conveying the data comprises verifying that the specified service instance is one of the multiple instances allocated to the single one of the processes (*Abstract and [0055]*).

8. As to claim 4, modified Parthasarathy teaches wherein allocating the instances comprises recording a context of each of the instances in a table (Translation Protection Table, etc) accessible to the network interface adapter, the context in the table indicating the respective doorbell address of the process to which each of the instances is allocated, and wherein conveying the data comprises verifying that the doorbell address to which the request was submitted matches the doorbell address indicated by the table for the specified instance ([0034], [0074], [0092]).

9. As to claim 5, modified Parthasarathy teaches wherein recording the context comprises maintaining the table in a memory accessible to the host device, while preventing (if not validated) access by the processes to the table ([0006] and [0046]).

10. As to claim 6, modified Parthasarathy teaches wherein the context further comprises at least a destination address and service type for each of the instances (destination address routing and destination endpoints) ([0029], [0032]).

11. As to claim 7, modified Parthasarathy teaches wherein assigning the respective doorbell address comprises assigning the address using an operating system running on the host device, and wherein receiving the request comprises receiving the request by the given process to write to its respective doorbell address by means of the operating system, which permits (from validating) each of the processes to write only to its own assigned doorbell address ([0006] and [0046]).

12. As to claim 8, modified Parthasarathy teaches wherein the communication service comprises a transport service (transport mechanism) ([0003], [0037], [0040]).

13. As to claim 9, modified Parthasarathy teaches wherein allocating the plurality of the instances comprises allocating pairs of work queues (work queue pairs), and wherein receiving the request comprises receiving a work request to place a work item in a specified one of the work queues, and wherein conveying the data comprises transporting the data to a destination address provided by a context of the specified work queue ([0004], [0025], [0032], [0062]).

14. As to claim 16, Parthasarathy teaches a network interface adapter (host-fabric adapter), for coupling a host device to a communication network (*see Abstract*), the adapter comprising:
a controller, which is arranged for a communication service provided by the adapter on the network to at least some of the processes on the host device, wherein the adapter receives a request submitted by a given one of the processes to its respective doorbell address to access one of the allocated service, to verify, based on the doorbell address to which the request was submitted, that the allocation to the given process before allowing the adapter, in response to the request, to convey data (data transfer) over the network (host-fabric) using the service (*see Abstract, claim 13, [0035], [0063], [0052], [0077]*);

15. Parthasarathy fails to explicitly teach allocating a plurality of instances of a communication service on the network, to be provided via the adapter, to at least some of the processes on the host device, such that each of the instances is allocated to a particular one of the

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processes. However, White teaches multiple TCP/IP instances operating with agents/adapters in a communication system between a client and network (*col. 1, lines 44-67 – col. 2, lines 1-3, col. 8, lines 9-18*). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the feature of allocating a plurality of instances of a communication service on the network, to be provided via the adapter, to at least some of the processes on the host device, such that each of the instances is allocated to a particular one of the processes to the existing network communication system of Parthasarathy because this would allow for an improved communication using TCP/IP and with the benefit of allowing multiple copies of a server on a single computer system (*col. 1, lines 32-67, col. 2, lines 16-20*).

16. However, Miller teaches that is well known and conventional for a process to be assigned a single address in memory (plurality or range of addresses) in order for protection from other processes (page 1, under Section 1). Therefore, it would have been obvious to one of ordinary skill in the art for Parthasarathy's invention to include assigning a single respective doorbell address in an address range of the host device, as taught in Miller as being well known, conventional, and not novel. The suggestion/motivation for doing so would have been to provide separate addresses/locations that would allow for protection from other processes (page 1, under Section 1).

17. Therefore, it would have been obvious to one of ordinary skill in the art to combine Parthasarathy, White and Miller to obtain the invention of claim 16.

18. As to claims 17-24, they are rejected for the same reasons as stated in the rejections of claims 2-9.

19. Claims 10-15 and 25-30 are rejected under 35 U.S.C. 103(a) as being unpatentable by Parthasarathy et al. (hereinafter Parthasarathy) (US 2002/0184392 A1) in view of Miller et al. (hereinafter Miller) (“Operating System Structure and Processor Architecture for a Large Distributed Single Address Space”, Computer Science and Engineering Department of Arizona State University, 1998).

20. As to claim 10, Parthasarathy teaches a method for controlling access by a process (data movement operation and location of data to be moved for processing and/or transportation via a data network, etc., [0004]) on a host device (host system 130, Fig. 2) to a communication network (Fig. 2, 10'), the method comprising:

allocating to the process a plurality of pairs of work queues (work queue pairs) on a channel adapter (host channel adapter or target channel adapter) that couples the host device to the network, for use by the process in sending and receiving communications over the network ([0004], [0025],[0031]- [0032], [0062]);

assigning to the process a single doorbell address (addresses) on the adapter (via doorbell manager) for use in accessing any of the plurality of the pairs of work queues (work queue pairs request the translation of address by the address translation interface 714) ([0074] and [0088]);

receiving a work request submitted by the process to the doorbell address to place a work item in one of the allocated queues (work queues) that is specified in the request (*see Abstract, claim 13, [0004], [0074], [0077], [0063] and [0052]*); and

transporting data (data transfer) over the network responsive to the work request (*see Abstract, claim 13, and [0077], [0063] and [0052]*).

21. Parthasarathy teaches using an address range ([0047]) but is silent on assigning a single respective doorbell address in an address range, in an address space of the host device.

22. However, Miller teaches that is well known and conventional for a process to be assigned a single address in memory (plurality or range of addresses) in order for protection from other processes (page 1, under Section 1). Therefore, it would have been obvious to one of ordinary skill in the art for Parthasarathy's invention to include assigning a single respective doorbell address in an address range of the host device, as taught in Miller as being well known, conventional, and not novel. The suggestion/motivation for doing so would have been to provide separate addresses/locations that would allow for protection from other processes (page 1, under Section 1).

23. As to claim 11, Parthasarathy teaches wherein transporting the data comprises verifying (verify and validity), based on the doorbell address to which the request was submitted, that the queue specified in the request was allocated to the process (*see Abstract, [0063] and [0052]*).

24. As to claim 12, Parthasarathy teaches wherein allocating the plurality of pairs of work queues comprises allocating the pairs of work queues to multiple processes on the host device,

such that each of the pairs is allocated to a particular one of the processors, and wherein assigning the single doorbell address comprises assigning multiple, respective doorbell addresses to the multiple processes ([0029], [0032], [0049], [0055]).

25. As to claim 13, Parthasarathy teaches wherein assigning the multiple doorbell addresses comprises assigning a single page in an address space of the host device to each of the processes for use by the processes as the respective doorbell addresses ([0029], [0032], [0049], [0055]).

26. As to claim 14, Parthasarathy teaches wherein assigning the multiple doorbell addresses comprises assigning the addresses using an operating system running on the host device, and wherein receiving the work request comprises receiving the request submitted by the process by means of the operating system, which permits (from validating) each of the processes to write only to its own assigned doorbell address ([0006] and [0046]).

27. As to claim 15, Parthasarathy teaches wherein allocating the pairs of work queues comprises recording a context of each of the pairs in a table accessible to the channel adapter (Translation Protection Table, etc), the context in the table indicating the respective doorbell address of the process to which each of the pairs is allocated, and wherein transporting the data comprises verifying that the doorbell address to which the request was submitted matches the doorbell address indicated by the table for the specified queue (*see Abstract*, [0034], [0074], [0092]).

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28. As to claims 25-30, they are rejected for the same reasons as stated in the rejections of claims 10-15.

Response to Arguments

29. During patent examination, the pending claims must be “given their broadest reasonable interpretation consistent with the specification.” *In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). Applicant always has the opportunity to amend the claims during prosecution, and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969).

30. *Applicant has argued, in the Remarks on 5/3/07, that the reference of Joshi is not valid prior art based on its date. Applicant makes further arguments of Joshi, even if it had been proper for the Examiner to cite it as prior art.*

In response, the Examiner finds the argument persuasive. A new ground of rejection involving Miller was used to show that the amended limitation from the amended claims of 7/24/06 is well known, conventional, and not novel. The Miller reference has a publication date of 1998, as shown below, and is valid as a 102(b) prior art date.

[PDF] Operating System Structure and Processor Architecture for a Large Distributed Single Address Space
A Skousen, D Miller - Proceedings of PDCS'98: 10 th International Conference on ..., 1998 - eas.asu.edu
... Because current **process**-oriented operating systems and their ... is to establish a single
network-wide address ... and the design of a **Single Address Space** Operating ...
Cited by 17 - Related Articles - View as HTML - Web Search

The Examiner acknowledges that no arguments were made in regards to the references of Parthasarathy and White. Therefore, applicant's arguments are moot in view of the new grounds of rejections set forth by the Examiner.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- **Elnozahy et al. (“The Performance of Consistent Checkpointing”, Rice University Department of Computer Science, IEEE, 1992, pages 39-47)**
discloses a process consists of a single address space in memory, wherein memory contains a plurality or range of addresses (page 40, under Section 2, Implementation).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth Tang whose telephone number is (571) 272-3772. The examiner can normally be reached on 8:30AM - 6:00PM, Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Meng-Ai An/
Supervisory Patent Examiner, Art Unit 2195